(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(43) International Publication Date 10 June 2004 (10.06.2004)

PCT

(10) International Publication Number WO 2004/049569 A1

- (51) International Patent Classification7:
- H03K 7/08
- (21) International Application Number:

PCT/IB2003/004890

- (22) International Filing Date: 29 October 2003 (29.10.2003)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

02079943.3

22 November 2002 (22.11.2002) EP

- (71) Applicant (for all designated States except US): KONIN-KLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): MELS, Frank, K., I. [BE/BE]; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (74) Agent: GROENENDAAL, Antonius, W., M.; Philips Intellectual Property & Standards, Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

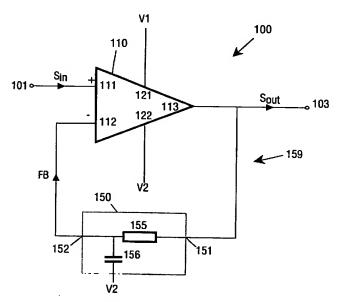
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, Fl, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,

[Continued on next page]

(54) Title: PWM GENERATOR



(57) Abstract: A PWM generator (100; 200; 300; 400) is described, which does not require a separate saw-tooth generator and a separate comparator for generating a modulated pulsed signal. According to the invention, the input signal (S_{in}) is supplied to one input terminal (111) of a comparator (110), which receives at its other terminal (112) a feedback signal which is derived from the output signal (S_{out}) via an integrator device (150), in such a way that the circuit is self-oscillating. The feedback signal is a sloping signal. The comparator switches its output when the feedback signal crosses the level of the input signal, which in turn causes the feedback signal to invert its slope. Thus, the feedback signal in effect provides a saw-tooth signal without being generated by a separate saw-tooth generator.



MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A. CLASS IPC 7	FICATION OF SUBJECT MATTER H03K7/08			
According t	o International Patent Classification (IPC) or to both national classif	ication and IPC		
	SEARCHED ocumentation searched (classification system followed by classifica-			
IPC 7	H03K	ution symbols)		
Documenta	tion searched other than minimum documentation to the extent that	such documents are included in the fields s	earched	
Electronic	lata base consulted during the International search (name of data b	ages and whom provided accept to		
	ternal, PAJ, WPI Data, IBM-TDB	ase and, where practical, search terms user		
C. DOCUM	ENTS CONSIDERED TO BE RELEVANT			
Category °	Citation of document, with Indication, where appropriate, of the n	elevant passages	Relevant to claim No.	
X	US 5 457 435 A (HOFFMAN JOHN P) 10 October 1995 (1995-10-10) figure 2		1-6	
X	DE 197 33 382 A (FAHRZEUGKLIMARE GMBH) 4 February 1999 (1999-02-0 column 1, line 29 - column 1, li figure 1	1–6		
X	PATENT ABSTRACTS OF JAPAN vol. 0062, no. 05 (E-136), 16 October 1982 (1982-10-16) & JP 57 111121 A (MICHIHIKO NAGA 10 July 1982 (1982-07-10) abstract	1-6		
	her documents are listed in the continuation of box C.	Patent family members are listed	in annex.	
"A" docume consider the consideration of th	ent which may throw doubts on priority claim(s) or is cited to establish the publication date of another no or other special reason (as specified) ent referring to an oral disclosure, use, exhibition or means ent published prior to the international filing date but nan the priority date claimed	T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. &* document member of the same patent family		
Date of the	actual completion of the international search	Date of mailing of the international sea	arch report	
3	March 2004	09/03/2004		
Name and r	nalling address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk	Authorized officer		
	Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Brown, J		

INTERNATIONAL SEARCH REPORT

on on patent family members

Interna	lication No
PCT/15 0:	3/04890

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5457435	Α	10-10-1995	NONE		
DE 19733382	Α	04-02-1999	DE	19733382 A1	04-02-1999
JP 57111121	Α	10-07-1982	NONE		